Use of timed light treatment to hasten circadian adaptation of offshore nightshift workers returning home to day life

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Introduction: Previous research has shown that subjects working 12 h shift schedules (18.00-06.00 h) offshore for 2 weeks adapt to the nightshift. However, if adaptation occurs, shift workers will be out of synchrony when they return home to day life with consequent problems of poor night sleep and reduced daytime alertness.

Aim: To investigate the effectiveness of timed light treatment to hasten circadian and sleep adaptation in nightshift workers returning home to day life.

Methods: Seven male shift workers (mean age ± SD) 47.3±9.2 yrs, BMI 28.8±2.5kg/m^2, worked 19.00-07.00h (n=2) or 18.00-06.00h (n=5) offshore shift schedules, at latitudes 58/59°N. They were assessed for the last 7 days of a nightshift offshore and the following 14 days at home. Subjects received light treatment/sunglasses or no light treatment/sunglasses in a crossover design. Sequential urine was collected for the last 3 days of the nightshift and the subsequent 7 days. Light was administered with a portable light box, Litebook®. After completion of their nightshift (day1) subjects wore specialised sunglasses (Litebook®) until 13.00h. On day 2 subjects wore sunglasses until 13.00h and then received light treatment for 1h. For the following 3 days the sunglasses and light treatment were scheduled an hour earlier each day. The light regimen was timed to phase advance the circadian system. Subjects wore an Actiwatch-L (Cambridge Neurotechnology) throughout the study period to monitor light and activity and completed daily sleep diaries. Sleep parameters derived from the actigraphy and diaries included sleep onset/offset, sleep latency, fragmentation index, sleep duration and sleep efficiency.

Results: Mean actigraphic sleep duration after the light treatment (days 6-14) was significantly longer on the light treatment leg (6.56±0.99 h, mean±SD) compared to the "no light" condition (5.21±0.85 h; paired Student's t-test, p=0.01). There was also a trend for improved sleep quality when subjects received light treatment. Sleep efficiency following light administration was 84.4±6.9% compared to 80.2±6.2% and fragmentation index was lower at 32.9±10.3 compared to 36.1±10.5.

Conclusions: Timed light administered to hasten adaptation to day life after working a night shift improved some aspects of sleep.

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